



SEQUENCE LISTING

<110> Heartlein, Michael W.
Lemontt, Jeffrey F.
Concino, Michael F.

B
<120> CHIMERIC PROTEINS FOR USE IN TRANSPORT
OF A SELECTED SUBSTANCE INTO CELLS

<130> 10278-025004

<140> US 09/753,385

<141> 2001-01-03

<150> US 08/470,058

<151> 1995-06-06

<150> US 09/037,188

<151> 1998-03-09

<150> US 09/285,310

<151> 1999-04-02

<160> 12

<170> FastSEQ for Windows Version 4.0

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Ala Leu Leu Ala Ala Gly Thr Ala Val Gly Asp Arg Cys Glu
15 20 25

97

aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg
Arg Asn Glu Phe Gln Cys Gln Asp Gly Lys Cys Ile Ser Tyr Lys Trp
30 35 40

145

gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag
Val Cys Asp Gly Ser Ala Glu Cys Gln Asp Gly Ser Asp Glu Ser Gln
45 50 55 60

193

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Glu Thr Cys Leu Ser Val Thr Cys Lys Ser Gly Asp Phe Ser Cys Gly

241

65	70	75	
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80	85	90	
gtg gac tgc gac aac ggc tca gac gag caa ggc tgt ccc ccc aag acg Val Asp Cys Asp Asn Gly Ser Asp Glu Gln Gly Cys Pro Pro Lys Thr			337
95	100	105	
tgc tcc cag gac gag ttt cgc tgc cac gat ggg aag tgc atc tct cgg Cys Ser Gln Asp Glu Phe Arg Cys His Asp Gly Lys Cys Ile Ser Arg			385
110	115	120	
cag ttc gtc tgt gac tca gac cgg gac tgc ttg gac ggc tca gac gag Gln Phe Val Cys Asp Ser Asp Arg Asp Cys Leu Asp Gly Ser Asp Glu			433
125	130	135	140
<i>B</i> <i>cont.</i>			
gcc tcc tgc ccg gtg ctc acc tgt ggt ccc gcc agc ttc cag tgc aac Ala Ser Cys Pro Val Leu Thr Cys Gly Pro Ala Ser Phe Gln Cys Asn			481
145	150	155	
agc tcc acc tgc atc ccc cag ctg tgg gcc tgc gac aac gac ccc gac Ser Ser Thr Cys Ile Pro Gln Leu Trp Ala Cys Asp Asn Asp Pro Asp			529
160	165	170	
tgc gaa gat ggc tcg gat gag tgg ccg cag cgc tgt agg ggt ctt tac Cys Glu Asp Gly Ser Asp Glu Trp Pro Gln Arg Cys Arg Gly Leu Tyr			577
175	180	185	
gtg ttc caa ggg gac agt agc ccc tgc tcg gcc ttc gag ttc cac tgc Val Phe Gln Gly Asp Ser Ser Pro Cys Ser Ala Phe Glu Phe His Cys			625
190	195	200	
cta agt ggc gag tgc atc cac tcc agc tgg cgc tgt gat ggt ggc ccc Leu Ser Gly Glu Cys Ile His Ser Ser Trp Arg Cys Asp Gly Gly Pro			673
205	210	215	220
gac tgc aag gac aaa tct gac gag gaa aac tgc gct gtg gcc acc tgt Asp Cys Lys Asp Lys Ser Asp Glu Asn Cys Ala Val Ala Thr Cys			721
225	230	235	
cgc cct gac gaa ttc cag tgc tct gat gga aac tgc atc cat ggc agc Arg Pro Asp Glu Phe Gln Cys Ser Asp Gly Asn Cys Ile His Gly Ser			769
240	245	250	
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255	260	265	
ggc tgc gtt aat gtg aca ctc tgc gag gga ccc aac aag ttc aag tgt Gly Cys Val Asn Val Thr Leu Cys Glu Gly Pro Asn Lys Phe Lys Cys			865
270	275	280	
cac agc ggc gaa tgc atc acc ctg gac aaa gtc tgc aac atg gct aga His Ser Gly Glu Cys Ile Thr Leu Asp Lys Val Cys Asn Met Ala Arg			913
285	290	295	300

gac tgc cgg gac tgg tca gat gaa ccc atc aaa gag tgc ggg acc aac 961
 Asp Cys Arg Asp Trp Ser Asp Glu Pro Ile Lys Glu Cys Gly Thr Asn
 305 310 315

gaa tgc ttg gac aac aac ggc ggc tgt tcc cac gtc tgc aat gac ctt 1009
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 320 325 330

aag atc ggc tac gag tgc ctg tgc ccc gac ggc ttc cag ctg gtg gcc 1057
 Lys Ile Gly Tyr Glu Cys Leu Cys Pro Asp Gly Phe Gln Leu Val Ala
 335 340 345

cag cga aga tgc gaa gat atc gat gag tgt cag gat ccc gac acc tgc 1105
 Gln Arg Arg Cys Glu Asp Ile Asp Glu Cys Gln Asp Pro Asp Thr Cys
 350 355 360

B
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agc cag ctc tgc gtg aac ctg gag ggt ggc tac aag tgc cag tgt gag 1153
 Ser Gln Leu Cys Val Asn Leu Glu Gly Gly Tyr Lys Cys Gln Cys Glu
 365 370 375 380

gaa ggc ttc cag ctg gac ccc cac acg aag gcc tgc aag gct gtg gtc 1201
 Glu Gly Phe Gln Leu Asp Pro His Thr Lys Ala Cys Lys Ala Val Val
 385 390 395

cct gat aaa act gtg aga tgg tgt gca gtg tcg gag cat gag gcc act 1249
 Pro Asp Lys Thr Val Arg Trp Cys Ala Val Ser Glu His Glu Ala Thr
 400 405 410

aag tgc cag agt ttc cgc gac cat atg aaa agc gtc att cca tcc gat 1297
 Lys Cys Gln Ser Phe Arg Asp His Met Lys Ser Val Ile Pro Ser Asp
 415 420 425

ggt ccc agt gtt gct tgt gtg aag aaa gcc tcc tac ctt gat tgc atc 1345
 Gly Pro Ser Val Ala Cys Val Lys Lys Ala Ser Tyr Leu Asp Cys Ile
 430 435 440

agg gcc att gcg gca aac gaa gcg gat gct gtg aca ctg gat gca ggt 1393
 Arg Ala Ile Ala Ala Asn Glu Ala Asp Ala Val Thr Leu Asp Ala Gly
 445 450 455 460

ttg gtg tat gat gct tac ttg gct ccc aat aac ctg aag cct gtg gtg 1441
 Leu Val Tyr Asp Ala Tyr Leu Ala Pro Asn Asn Leu Lys Pro Val Val
 465 470 475

gca gag ttc tat ggg tca aaa gag gat cca cag act ttc tat tat gct 1489
 Ala Glu Phe Tyr Gly Ser Lys Glu Asp Pro Gln Thr Phe Tyr Tyr Ala
 480 485 490

gtt gct gtg gtg aag aag gat agt ggc ttc cag atg aac cag ctt cga 1537
 Val Ala Val Val Lys Lys Asp Ser Gly Phe Gln Met Asn Gln Leu Arg
 495 500 505

ggc aag aag tcc tgc cac acg ggt cta ggc agg tcc gct ggg tgg aac 1585
 Gly Lys Lys Ser Cys His Thr Gly Leu Gly Arg Ser Ala Gly Trp Asn
 510 515 520

atc ccc ata ggc tta ctt tac tgt gac tta cct gag cca cgt aaa cct Ile Pro Ile Gly Leu Leu Tyr Cys Asp Leu Pro Glu Pro Arg Lys Pro 525 530 535 540 545 550 555	1633
ctt gag aaa gca gtg gcc aat ttc ttc tcg ggc agc tgt gcc cct tgt Leu Glu Lys Ala Val Ala Asn Phe Phe Ser Gly Ser Cys Ala Pro Cys 545 550 555	1681
gcg gat ggg acg gac ttc ccc cag ctg tgt caa ctg tgt cca ggg tgt Ala Asp Gly Thr Asp Phe Pro Gln Leu Cys Gln Leu Cys Pro Gly Cys 560 565 570	1729
ggc tgc tcc acc ctt aac caa tac ttc ggc tac tcg gga gcc ttc aag Gly Cys Ser Thr Leu Asn Gln Tyr Phe Gly Tyr Ser Gly Ala Phe Lys 575 580 585	1777
tgt ctg aag gat ggt gct ggg gat gtg gcc ttt gtc aag cac tcg act Cys Leu Lys Asp Gly Ala Gly Asp Val Ala Phe Val Lys His Ser Thr 590 595 600	1825
ata ttt gag aac ttg gca aac aag gct gac agg gac cag tat gag ctg Ile Phe Glu Asn Leu Ala Asn Lys Ala Asp Arg Asp Gln Tyr Glu Leu 605 610 615 620	1873
ctt tgc cta gac aac acc cgg aag ccg gta gat gaa tac aag gac tgc Leu Cys Leu Asp Asn Thr Arg Lys Pro Val Asp Glu Tyr Lys Asp Cys 625 630 635	1921
cac ttg gcc cag gtc cct tct cat acc gtc gtg gcc cga agt atg ggc His Leu Ala Gln Val Pro Ser His Thr Val Val Ala Arg Ser Met Gly 640 645 650	1969
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ttt ggc aaa gac aaa tca aaa gaa ttc caa cta ttc agc tct cct cat Phe Gly Lys Asp Lys Ser Lys Glu Phe Gln Leu Phe Ser Ser Pro His 670 675 680	2065
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ccc cca agg atg gat gcc aag atg tac ctg ggc tat gag tat gtc act Pro Pro Arg Met Asp Ala Lys Met Tyr Leu Gly Tyr Glu Tyr Val Thr 705 710 715	2161
gcc atc cgg aat cta cgg gaa ggc aca tgc cca gaa gcc cca aca gat Ala Ile Arg Asn Leu Arg Glu Gly Thr Cys Pro Glu Ala Pro Thr Asp 720 725 730	2209
gaa tgc aag cct gtg aag tgg tgt gcg ctg agc cac cac gag agg ctc Glu Cys Lys Pro Val Lys Trp Cys Ala Leu Ser His His Glu Arg Leu 735 740 745	2257
aag tgt gat gag tgg agt gtt aac agt gta ggg aaa ata gag tgt gta	2305

B
cont.

Lys Cys Asp Glu Trp Ser Val Asn Ser Val Gly Lys Ile Glu Cys Val
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tca gca gag acc acc gaa gac tgc atc gcc aag atc atg aat gga gaa 2353
 Ser Ala Glu Thr Thr Glu Asp Cys Ile Ala Lys Ile Met Asn Gly Glu
 765 770 775 780

gct gat gcc atg agc ttg gat gga ggg ttt gtc tac ata gcg ggc aag 2401
 Ala Asp Ala Met Ser Leu Asp Gly Gly Phe Val Tyr Ile Ala Gly Lys
 785 790 795

tgt ggt ctg gtg cct gtc ttg gca gaa aac tac aat aag agc gat aat 2449
 Cys Gly Leu Val Pro Val Leu Ala Glu Asn Tyr Asn Lys Ser Asp Asn
 800 805 810

tgt gag gat aca cca gag gca ggg tat ttt gct gta gca gtg gtg aag 2497
 Cys Glu Asp Thr Pro Glu Ala Gly Tyr Phe Ala Val Ala Val Val Lys
 815 820 825

B
unt.

aaa tca gct tct gac ctc acc tgg gac aat ctg aaa ggc aag aag tcc 2545
 Lys Ser Ala Ser Asp Leu Thr Trp Asp Asn Leu Lys Gly Lys Lys Ser
 830 835 840

tgc cat acg gca gtt ggc aga acc gct ggc tgg aac atc ccc atg ggc 2593
 Cys His Thr Ala Val Gly Arg Thr Ala Gly Trp Asn Ile Pro Met Gly
 845 850 855 860

ctg ctc tac aat aag atc aac cac tgc aga ttt gat gaa ttt ttc agt 2641
 Leu Leu Tyr Asn Lys Ile Asn His Cys Arg Phe Asp Glu Phe Phe Ser
 865 870 875

gaa ggt tgt gcc cct ggg tct aag aaa gac tcc agt ctc tgt aag ctg 2689
 Glu Gly Cys Ala Pro Gly Ser Lys Lys Asp Ser Ser Leu Cys Lys Leu
 880 885 890

tgt atg ggc tca ggc cta aac ctg tgt gaa ccc aac aac aaa gag gga 2737
 Cys Met Gly Ser Gly Leu Asn Leu Cys Glu Pro Asn Asn Lys Glu Gly
 895 900 905

tac tac ggc tac aca ggc gct ttc agg tgt ctg gtt gag aag gga gat 2785
 Tyr Tyr Gly Tyr Thr Gly Ala Phe Arg Cys Leu Val Glu Lys Gly Asp
 910 915 920

gtg gcc ttt gtg aaa cac cag act gtc cca cag aac act ggg gga aaa 2833
 Val Ala Phe Val Lys His Gln Thr Val Pro Gln Asn Thr Gly Gly Lys
 925 930 935 940

aac cct gat cca tgg gct aag aat ctg aat gaa aaa gac tat gag ttg 2881
 Asn Pro Asp Pro Trp Ala Lys Asn Leu Asn Glu Lys Asp Tyr Glu Leu
 945 950 955

ctg tgc ctt gat ggt acc agg aaa cct gtg gag gag tat gcg aac tgc 2929
 Leu Cys Leu Asp Gly Thr Arg Lys Pro Val Glu Glu Tyr Ala Asn Cys
 960 965 970

cac ctg gcc aga gcc ccg aat cac gct gtg gtc aca cgaa gat aag 2977
 His Leu Ala Arg Ala Pro Asn His Ala Val Val Thr Arg Lys Asp Lys

975	980	985	
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agc aac gta act gac tgc tcg ggc aac ttt tgt ttg ttc cg ^g tcg gaa Ser Asn Val Thr Asp Cys Ser Gly Asn Phe Cys Leu Phe Arg Ser Glu 1005 1010 1015 1020			3073
acc aag gac ctt ctg ttc aga gat gac aca gta tgt ttg gcc aaa ctt Thr Lys Asp Leu Leu Phe Arg Asp Asp Thr Val Cys Leu Ala Lys Leu 1025 1030 1035			3121
cat gac aga aac aca tat gaa aaa tac tta gga gaa gaa tat gtc aag His Asp Arg Asn Thr Tyr Glu Lys Tyr Leu Gly Glu Glu Tyr Val Lys 1040 1045 1050			3169
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tgc act ttc cgt aga cct taaaatctca gaggttagggc tgccaccaag Cys Thr Phe Arg Arg Pro 1070			3265
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Ser Ala Glu Cys Gln Asp Gly Ser Asp Glu Ser Gln Glu Thr Cys Leu 50 55 60			
Ser Val Thr Cys Lys Ser Gly Asp Phe Ser Cys Gly Gly Arg Val Asn 65 70 75 80			
Arg Cys Ile Pro Gln Phe Trp Arg Cys Asp Gly Gln Val Asp Cys Asp 85 90 95			
Asn Gly Ser Asp Glu Gln Gly Cys Pro Pro Lys Thr Cys Ser Gln Asp 100 105 110			
Glu Phe Arg Cys His Asp Gly Lys Cys Ile Ser Arg Gln Phe Val Cys 115 120 125			
Asp Ser Asp Arg Asp Cys Leu Asp Gly Ser Asp Glu Ala Ser Cys Pro 130 135 140			
Val Leu Thr Cys Gly Pro Ala Ser Phe Gln Cys Asn Ser Ser Thr Cys 145 150 155 160			
Ile Pro Gln Leu Trp Ala Cys Asp Asn Asp Pro Asp Cys Glu Asp Gly			

	165	170	175
Ser Asp Glu Trp Pro Gln Arg Cys Arg Gly Leu Tyr Val Phe Gln Gly			
180	185	190	
Asp Ser Ser Pro Cys Ser Ala Phe Glu Phe His Cys Leu Ser Gly Glu			
195	200	205	
Cys Ile His Ser Ser Trp Arg Cys Asp Gly Gly Pro Asp Cys Lys Asp			
210	215	220	
Lys Ser Asp Glu Glu Asn Cys Ala Val Ala Thr Cys Arg Pro Asp Glu			
225	230	235	240
Phe Gln Cys Ser Asp Gly Asn Cys Ile His Gly Ser Arg Gln Cys Asp			
245	250	255	
Arg Glu Tyr Asp Cys Lys Asp Met Ser Asp Glu Val Gly Cys Val Asn			
260	265	270	
Val Thr Leu Cys Glu Gly Pro Asn Lys Phe Lys Cys His Ser Gly Glu			
275	280	285	
Cys Ile Thr Leu Asp Lys Val Cys Asn Met Ala Arg Asp Cys Arg Asp			
290	295	300	
Trp Ser Asp Glu Pro Ile Lys Glu Cys Gly Thr Asn Glu Cys Leu Asp			
305	310	315	320
Asn Asn Gly Cys Ser His Val Cys Asn Asp Leu Lys Ile Gly Tyr			
325	330	335	
Glu Cys Leu Cys Pro Asp Gly Phe Gln Leu Val Ala Gln Arg Arg Cys			
340	345	350	
Glu Asp Ile Asp Glu Cys Gln Asp Pro Asp Thr Cys Ser Gln Leu Cys			
355	360	365	
Val Asn Leu Glu Gly Gly Tyr Lys Cys Gln Cys Glu Glu Gly Phe Gln			
370	375	380	
Leu Asp Pro His Thr Lys Ala Cys Lys Ala Val Val Pro Asp Lys Thr			
385	390	395	400
Val Arg Trp Cys Ala Val Ser Glu His Glu Ala Thr Lys Cys Gln Ser			
405	410	415	
Phe Arg Asp His Met Lys Ser Val Ile Pro Ser Asp Gly Pro Ser Val			
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Ala Cys Val Lys Lys Ala Ser Tyr Leu Asp Cys Ile Arg Ala Ile Ala			
435	440	445	
Ala Asn Glu Ala Asp Ala Val Thr Leu Asp Ala Gly Leu Val Tyr Asp			
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Ala Tyr Leu Ala Pro Asn Asn Leu Lys Pro Val Val Ala Glu Phe Tyr			
465	470	475	480
Gly Ser Lys Glu Asp Pro Gln Thr Phe Tyr Tyr Ala Val Ala Val Val			
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Lys Lys Asp Ser Gly Phe Gln Met Asn Gln Leu Arg Gly Lys Lys Ser			
500	505	510	
Cys His Thr Gly Leu Gly Arg Ser Ala Gly Trp Asn Ile Pro Ile Gly			
515	520	525	
Leu Leu Tyr Cys Asp Leu Pro Glu Pro Arg Lys Pro Leu Glu Lys Ala			
530	535	540	
Val Ala Asn Phe Phe Ser Gly Ser Cys Ala Pro Cys Ala Asp Gly Thr			
545	550	555	560
Asp Phe Pro Gln Leu Cys Gln Leu Cys Pro Gly Cys Gly Cys Ser Thr			
565	570	575	
Leu Asn Gln Tyr Phe Gly Tyr Ser Gly Ala Phe Lys Cys Leu Lys Asp			
580	585	590	
Gly Ala Gly Asp Val Ala Phe Val Lys His Ser Thr Ile Phe Glu Asn			
595	600	605	
Leu Ala Asn Lys Ala Asp Arg Asp Gln Tyr Glu Leu Leu Cys Leu Asp			
610	615	620	

Asn Thr Arg Lys Pro Val Asp Glu Tyr Lys Asp Cys His Leu Ala Gln
 625 630 635 640
 Val Pro Ser His Thr Val Val Ala Arg Ser Met Gly Gly Lys Glu Asp
 645 650 655
 Leu Ile Trp Glu Leu Leu Asn Gln Ala Gln Glu His Phe Gly Lys Asp
 660 665 670
 Lys Ser Lys Glu Phe Gln Leu Phe Ser Ser Pro His Gly Lys Asp Leu
 675 680 685
 Leu Phe Lys Asp Ser Ala His Gly Phe Leu Lys Val Pro Pro Arg Met
 690 695 700
 Asp Ala Lys Met Tyr Leu Gly Tyr Glu Tyr Val Thr Ala Ile Arg Asn
 705 710 715 720
 Leu Arg Glu Gly Thr Cys Pro Glu Ala Pro Thr Asp Glu Cys Lys Pro
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 Val Lys Trp Cys Ala Leu Ser His His Glu Arg Leu Lys Cys Asp Glu
 740 745 750
 Trp Ser Val Asn Ser Val Gly Lys Ile Glu Cys Val Ser Ala Glu Thr
 755 760 765
 Thr Glu Asp Cys Ile Ala Lys Ile Met Asn Gly Glu Ala Asp Ala Met
 770 775 780
 Ser Leu Asp Gly Gly Phe Val Tyr Ile Ala Gly Lys Cys Gly Leu Val
 785 790 795 800
 Pro Val Leu Ala Glu Asn Tyr Asn Lys Ser Asp Asn Cys Glu Asp Thr
 805 810 815
 Pro Glu Ala Gly Tyr Phe Ala Val Ala Val Val Lys Lys Ser Ala Ser
 820 825 830
 Asp Leu Thr Trp Asp Asn Leu Lys Lys Ser Cys His Thr Ala
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 Val Gly Arg Thr Ala Gly Trp Asn Ile Pro Met Gly Leu Leu Tyr Asn
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 Lys Ile Asn His Cys Arg Phe Asp Glu Phe Phe Ser Glu Gly Cys Ala
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 Pro Gly Ser Lys Lys Asp Ser Ser Leu Cys Lys Leu Cys Met Gly Ser
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 Gly Leu Asn Leu Cys Glu Pro Asn Asn Lys Glu Gly Tyr Tyr Gly Tyr
 900 905 910
 Thr Gly Ala Phe Arg Cys Leu Val Glu Lys Gly Asp Val Ala Phe Val
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 Lys His Gln Thr Val Pro Gln Asn Thr Gly Gly Lys Asn Pro Asp Pro
 930 935 940
 Trp Ala Lys Asn Leu Asn Glu Lys Asp Tyr Glu Leu Leu Cys Leu Asp
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 Gly Thr Arg Lys Pro Val Glu Glu Tyr Ala Asn Cys His Leu Ala Arg
 965 970 975
 Ala Pro Asn His Ala Val Val Thr Arg Lys Asp Lys Glu Ala Cys Val
 980 985 990
 His Lys Ile Leu Arg Gln Gln His Leu Phe Gly Ser Asn Val Thr
 995 1000 1005
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 1010 1015 1020
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 1025 1030 1035 1040
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 15 20 25

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 Arg Asn Glu Phe Gln Cys Gln Asp Gly Lys Cys Ile Ser Tyr Lys Trp
 30 35 40

 gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag 193
 Val Cys Asp Gly Ser Ala Glu Cys Gln Asp Gly Ser Asp Glu Ser Gln
 45 50 55 60

 gag acg tgc ttg tct gtc acc tgc aaa tcc ggg gac ttc agc tgt ggg 241
 Glu Thr Cys Leu Ser Val Thr Cys Lys Ser Gly Asp Phe Ser Cys Gly
 65 70 75

 ggc cgt gtc aac cgc tgc att cct cag ttc tgg agg tgc gat ggc caa 289
 Gly Arg Val Asn Arg Cys Ile Pro Gln Phe Trp Arg Cys Asp Gly Gln
 80 85 90

 gtg gac tgc gac aac ggc tca gac gag caa ggc tgt ccc ccc aag acg 337
 Val Asp Cys Asp Asn Gly Ser Asp Glu Gln Gly Cys Pro Pro Lys Thr
 95 100 105

 tgc tcc cag gac gag ttt cgc tgc cac gat ggg aag tgc atc tct cgg 385
 Cys Ser Gln Asp Glu Phe Arg Cys His Asp Gly Lys Cys Ile Ser Arg
 110 115 120

 cag ttc gtc tgt gac tca gac cgg gac tgc ttg gac ggc tca gac gag 433
 Gln Phe Val Cys Asp Ser Asp Arg Asp Cys Leu Asp Gly Ser Asp Glu
 125 130 135 140

 gcc tcc tgc ccg gtg ctc acc tgt ggt ccc gcc agc ttc cag tgc aac 481
 Ala Ser Cys Pro Val Leu Thr Cys Gly Pro Ala Ser Phe Gln Cys Asn
 145 150 155

 agc tcc acc tgc atc ccc cag ctg tgg gcc tgc gac aac gac ccc gac 529
 Ser Ser Thr Cys Ile Pro Gln Leu Trp Ala Cys Asp Asn Asp Pro Asp
 160 165 170

 tgc gaa gat ggc tcg gat gag tgg ccg cag cgc tgt agg ggt ctt tac 577

Cys Glu Asp Gly Ser Asp Glu Trp Pro Gln Arg Cys Arg Gly Leu Tyr			
175	180	185	
gtg ttc caa ggg gac agt agc ccc tgc tcg gcc ttc gag ttc cac tgc			625
Val Phe Gln Gly Asp Ser Ser Pro Cys Ser Ala Phe Glu Phe His Cys			
190	195	200	
cta agt ggc gag tgc atc cac tcc agc tgg cgc tgt gat ggt ggc ccc			673
Leu Ser Gly Glu Cys Ile His Ser Ser Trp Arg Cys Asp Gly Gly Pro			
205	210	215	220
gac tgc aag gac aaa tct gac gag gaa aac tgc gct gtg gcc acc tgt			721
Asp Cys Lys Asp Lys Ser Asp Glu Glu Asn Cys Ala Val Ala Thr Cys			
225	230	235	
cgc cct gac gaa ttc cag tgc tct gat gga aac tgc atc cat ggc agc			769
Arg Pro Asp Glu Phe Gln Cys Ser Asp Gly Asn Cys Ile His Gly Ser			
240	245	250	
cgg cag tgt gac cg ^g gaa tat gac tgc aag gac atg agc gat gaa gtt			817
Arg Gln Cys Asp Arg Glu Tyr Asp Cys Lys Asp Met Ser Asp Glu Val			
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ggc tgc gtt aat gtg aca ctc tgc gag gga ccc aac aag ttc aag tgt			865
Gly Cys Val Asn Val Thr Leu Cys Glu Gly Pro Asn Lys Phe Lys Cys			
270	275	280	
cac agc ggc gaa tgc atc acc ctg gac aaa gtc tgc aac atg gct aga			913
His Ser Gly Glu Cys Ile Thr Leu Asp Lys Val Cys Asn Met Ala Arg			
285	290	295	300
gac tgc cg ^g gac tgg tca gat gaa ccc atc aaa gag tgc ggg acc aac			961
Asp Cys Arg Asp Trp Ser Asp Glu Pro Ile Lys Glu Cys Gly Thr Asn			
305	310	315	
gaa tgc ttg gac aac aac ggc ggc tgt tcc cac gtc tgc aat gac ctt			1009
Glu Cys Leu Asp Asn Asn Gly Gly Cys Ser His Val Cys Asn Asp Leu			
320	325	330	
aag atc ggc tac gag tgc ctg ccc gac ggc ttc cag ctg gtg gcc			1057
Lys Ile Gly Tyr Glu Cys Leu Cys Pro Asp Gly Phe Gln Leu Val Ala			
335	340	345	
cag cga aga tgc gaa gat atc gat gag tgt cag gat ccc gac acc tgc			1105
Gln Arg Arg Cys Glu Asp Ile Asp Glu Cys Gln Asp Pro Asp Thr Cys			
350	355	360	
agc cag ctc tgc gtg aac ctg gag ggt ggc tac aag tgc cag tgt gag			1153
Ser Gln Leu Cys Val Asn Leu Glu Gly Gly Tyr Lys Cys Gln Cys Glu			
365	370	375	380
gaa ggc ttc cag ctg gac ccc cac acg aag gcc tgc aag gct gtg ggc			1201
Glu Gly Phe Gln Leu Asp Pro His Thr Lys Ala Cys Lys Ala Val Gly			
385	390	395	
tcc atc gcc tac ctc ttc acc aac cgg cac gag gtc agg aag atg			1249
Ser Ile Ala Tyr Leu Phe Phe Thr Asn Arg His Glu Val Arg Lys Met			

400	405	410	
acg ctg gac cg ^g agc gag tac acc agc ctc atc ccc aac ctg agg aac Thr Leu Asp Arg Ser Glu Tyr Thr Ser Leu Ile Pro Asn Leu Arg Asn	415	420	1297
	420	425	
gtg gtc gct ctg gac acg gag gtg gcc agc aat aga atc tac tgg tct Val Val Ala Leu Asp Thr Glu Val Ala Ser Asn Arg Ile Tyr Trp Ser	430	435	1345
	435	440	
gac ctg tcc cag aga atg atc tgc agc acc cag ctt gac aga gcc cac Asp Leu Ser Gln Arg Met Ile Cys Ser Thr Gln Leu Asp Arg Ala His	445	450	1393
	455	460	
ggc gtc tct tcc tat gac acc gtc atc agc agg gac atc cag gcc ccc Gly Val Ser Ser Tyr Asp Thr Val Ile Ser Arg Asp Ile Gln Ala Pro	465	470	1441
	470	475	
gac ggg ctg gct gtg gac tgg atc cac agc aac atc tac tgg acc gac Asp Gly Leu Ala Val Asp Trp Ile His Ser Asn Ile Tyr Trp Thr Asp	480	485	1489
	485	490	
tct gtc ctg ggc act gtc tct gtt gc ^g gat acc aag ggc gtg aag agg Ser Val Leu Gly Thr Val Ser Val Ala Asp Thr Lys Gly Val Lys Arg	495	500	1537
	500	505	
aaa acg tta ttc agg gag aac ggc tcc aag cca agg gcc atc gtg gtg Lys Thr Leu Phe Arg Glu Asn Gly Ser Lys Pro Arg Ala Ile Val Val	510	515	1585
	515	520	
gat cct gtt cat ggc ttc atg tac tgg act gac tgg gga act ccc gcc Asp Pro Val His Gly Phe Met Tyr Trp Thr Asp Trp Gly Thr Pro Ala	525	530	1633
	530	535	
aag atc aag aaa ggg ggc ctg aat ggt gtg gac atc tac tcg ctg gtg Lys Ile Lys Lys Gly Gly Leu Asn Gly Val Asp Ile Tyr Ser Leu Val	545	550	1681
	550	555	
act gaa aac att cag tgg ccc aat ggc atc acc cta gat ctc ctc agt Thr Glu Asn Ile Gln Trp Pro Asn Gly Ile Thr Leu Asp Leu Leu Ser	560	565	1729
	565	570	
ggc cgc ctc tac tgg gtt gac tcc aaa ctt cac tcc atc tca agc atc Gly Arg Leu Tyr Trp Val Asp Ser Lys Leu His Ser Ile Ser Ser Ile	575	580	1777
	580	585	
gat gtc aat ggg ggc aac cgg aag acc atc ttg gag gat gaa aag agg Asp Val Asn Gly Gly Asn Arg Lys Thr Ile Leu Glu Asp Glu Lys Arg	590	595	1825
	595	600	
ctg gcc cac ccc ttc tcc ttg gcc gtc ttt gag gac aaa gta ttt tgg Leu Ala His Pro Phe Ser Leu Ala Val Phe Glu Asp Lys Val Phe Trp	605	610	1873
	610	615	
	615	620	
aca gat atc atc aac gaa gcc att ttc agt gcc aac cgc ctc aca ggt Thr Asp Ile Ile Asn Glu Ala Ile Phe Ser Ala Asn Arg Leu Thr Gly	625	630	1921
	630	635	

tcc gat gtc aac ttg ttg gct gaa aac cta ctg tcc cca gag gat atg Ser Asp Val Asn Leu Leu Ala Glu Asn Leu Leu Ser Pro Glu Asp Met 640 645 650	1969
gtc ctc ttc cac aac ctc acc cag cca aga gga gtg aac tgg tgt gag Val Leu Phe His Asn Leu Thr Gln Pro Arg Gly Val Asn Trp Cys Glu 655 660 665	2017
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gct gca gtg gcc acc cag gag aca tcc acc gtc agg cta aag gtc gtc Ala Ala Val Ala Thr Gln Glu Thr Ser Thr Val Arg Leu Lys Val Val 720 725 730	2209
cct gat aaa act gtg aga tgg tgt gca gtg tcg gag cat gag gcc act Pro Asp Lys Thr Val Arg Trp Cys Ala Val Ser Glu His Glu Ala Thr 735 740 745	2257
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ggt ccc agt gtt gct tgt gtg aag aaa gcc tcc tac ctt gat tgc atc Gly Pro Ser Val Ala Cys Val Lys Lys Ala Ser Tyr Leu Asp Cys Ile 765 770 775 780	2353
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atc ccc ata ggc tta ctt tac tgt gac tta cct gag cca cgt aaa cct Ile Pro Ile Gly Leu Leu Tyr Cys Asp Leu Pro Glu Pro Arg Lys Pro 865 870 875	2641
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ggc tgc tcc acc ctt aac caa tac ttc ggc tac tcg gga gcc ttc aag Gly Cys Ser Thr Leu Asn Gln Tyr Phe Gly Tyr Ser Gly Ala Phe Lys 910 915 920	2785
tgt ctg aag gat ggt gct ggg gat gtg gcc ttt gtc aag cac tcg act Cys Leu Lys Asp Gly Ala Gly Asp Val Ala Phe Val Lys His Ser Thr 925 930 935 940	2833
ata ttt gag aac ttg gca aac aag gct gac agg gac cag tat gag ctg Ile Phe Glu Asn Leu Ala Asn Lys Ala Asp Arg Asp Gln Tyr Glu Leu 945 950 955	2881
ctt tgc cta gac aac acc cg ^g aag cc ^g gta gat gaa tac aag gac tgc Leu Cys Leu Asp Asn Thr Arg Lys Pro Val Asp Glu Tyr Lys Asp Cys 960 965 970	2929
cac ttg gcc cag gtc cct tct cat acc gtc gtg gcc cga agt atg ggc His Leu Ala Gln Val Pro Ser His Thr Val Val Ala Arg Ser Met Gly 975 980 985	2977
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ccc cca agg atg gat gcc aag atg tac ctg ggc tat gag tat gtc act Pro Pro Arg Met Asp Ala Lys Met Tyr Leu Gly Tyr Glu Tyr Val Thr 1040 1045 1050	3169
gcc atc cgg aat cta cgg gaa ggc aca tgc cca gaa gcc cca aca gat Ala Ile Arg Asn Leu Arg Glu Gly Thr Cys Pro Glu Ala Pro Thr Asp 1055 1060 1065	3217
gaa tgc aag cct gtg aag tgg tgt gcg ctg agc cac cac gag agg ctc Glu Cys Lys Pro Val Lys Trp Cys Ala Leu Ser His His Glu Arg Leu 1070 1075 1080	3265
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Lys Cys Asp Glu Trp Ser Val Asn Ser Val Gly Lys Ile Glu Cys Val			
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Ser Ala Glu Thr Thr Glu Asp Cys Ile Ala Lys Ile Met Asn Gly Glu			
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gct gat gcc atg agc ttg gat gga ggg ttt gtc tac ata gcg ggc aag			3409
Ala Asp Ala Met Ser Leu Asp Gly Gly Phe Val Tyr Ile Ala Gly Lys			
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tgt ggt ctg gtg cct gtc ttg gca gaa aac tac aat aag agc gat aat			3457
Cys Gly Leu Val Pro Val Leu Ala Glu Asn Tyr Asn Lys Ser Asp Asn			
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tgt gag gat aca cca gag gca ggg tat ttt gct gta gca gtg gtg aag			3505
Cys Glu Asp Thr Pro Glu Ala Gly Tyr Phe Ala Val Ala Val Val Lys			
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aaa tca gct tct gac ctc acc tgg gac aat ctg aaa ggc aag aag tcc			3553
Lys Ser Ala Ser Asp Leu Thr Trp Asp Asn Leu Lys Gly Lys Lys Ser			
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tgc cat acg gca gtt ggc aga acc gct ggc tgg aac atc ccc atg ggc			3601
Cys His Thr Ala Val Gly Arg Thr Ala Gly Trp Asn Ile Pro Met Gly			
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Leu Leu Tyr Asn Lys Ile Asn His Cys Arg Phe Asp Glu Phe Phe Ser			
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gaa ggt tgt gcc cct ggg tct aag aaa gac tcc agt ctc tgt aag ctg			3697
Glu Gly Cys Ala Pro Gly Ser Lys Lys Asp Ser Ser Leu Cys Lys Leu			
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tgt atg ggc tca ggc cta aac ctg tgt gaa ccc aac aac aaa gag gga			3745
Cys Met Gly Ser Gly Leu Asn Leu Cys Glu Pro Asn Asn Lys Glu Gly			
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tac tac ggc tac aca ggc gct ttc agg tgt ctg gtt gag aag gga gat			3793
Tyr Tyr Gly Tyr Thr Gly Ala Phe Arg Cys Leu Val Glu Lys Gly Asp			
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gtg gcc ttt gtg aaa cac cag act gtc cca cag aac act ggg gga aaa			3841
Val Ala Phe Val Lys His Gln Thr Val Pro Gln Asn Thr Gly Gly Lys			
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Asn Pro Asp Pro Trp Ala Lys Asn Leu Asn Glu Lys Asp Tyr Glu Leu			
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Leu Cys Leu Asp Gly Thr Arg Lys Pro Val Glu Glu Tyr Ala Asn Cys			
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cac ctg gcc aga gcc ccg aat cac gct gtg gtc aca cg aaaa gat aag			3985
His Leu Ala Arg Ala Pro Asn His Ala Val Val Thr Arg Lys Asp Lys			

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gaa gct tgc gtc cac aag ata tta cgt caa cag cag cac cta ttt gga Glu Ala Cys Val His Lys Ile Leu Arg Gln Gln Gln His Leu Phe Gly			4033
1325	1330	1335	1340
agc aac gta act gac tgc tcg ggc aac ttt tgt ttg ttc cg ^g tcg gaa Ser Asn Val Thr Asp Cys Ser Gly Asn Phe Cys Leu Phe Arg Ser Glu			4081
1345	1350	1355	
acc aag gac ctt ctg ttc aga gat gac aca gta tgt ttg gcc aaa ctt Thr Lys Asp Leu Leu Phe Arg Asp Asp Thr Val Cys Leu Ala Lys Leu			4129
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cat gac aga aac aca tat gaa aaa tac tta gga gaa gaa tat gtc aag His Asp Arg Asn Thr Tyr Glu Lys Tyr Leu Gly Glu Tyr Val Lys			4177
1375	1380	1385	
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Ser Ala Glu Cys Gln Asp Gly Ser Asp Glu Ser Gln Glu Thr Cys Leu 50 55 60			
Ser Val Thr Cys Lys Ser Gly Asp Phe Ser Cys Gly Gly Arg Val Asn 65 70 75 80			
Arg Cys Ile Pro Gln Phe Trp Arg Cys Asp Gly Gln Val Asp Cys Asp 85 90 95			
Asn Gly Ser Asp Glu Gln Gly Cys Pro Pro Lys Thr Cys Ser Gln Asp 100 105 110			
Glu Phe Arg Cys His Asp Gly Lys Cys Ile Ser Arg Gln Phe Val Cys 115 120 125			
Asp Ser Asp Arg Asp Cys Leu Asp Gly Ser Asp Glu Ala Ser Cys Pro 130 135 140			

Val Leu Thr Cys Gly Pro Ala Ser Phe Gln Cys Asn Ser Ser Thr Cys
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 Ile Pro Gln Leu Trp Ala Cys Asp Asn Asp Pro Asp Cys Glu Asp Gly
 165 170 175
 Ser Asp Glu Trp Pro Gln Arg Cys Arg Gly Leu Tyr Val Phe Gln Gly
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 Asp Ser Ser Pro Cys Ser Ala Phe Glu Phe His Cys Leu Ser Gly Glu
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 Cys Ile His Ser Ser Trp Arg Cys Asp Gly Gly Pro Asp Cys Lys Asp
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 Lys Ser Asp Glu Glu Asn Cys Ala Val Ala Thr Cys Arg Pro Asp Glu
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 Phe Gln Cys Ser Asp Gly Asn Cys Ile His Gly Ser Arg Gln Cys Asp
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 Arg Glu Tyr Asp Cys Lys Asp Met Ser Asp Glu Val Gly Cys Val Asn
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 Val Thr Leu Cys Glu Gly Pro Asn Lys Phe Lys Cys His Ser Gly Glu
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 Arg Met Ile Cys Ser Thr Gln Leu Asp Arg Ala His Gly Val Ser Ser
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 Tyr Asp Thr Val Ile Ser Arg Asp Ile Gln Ala Pro Asp Gly Leu Ala
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 Gln Trp Pro Asn Gly Ile Thr Leu Asp Leu Leu Ser Gly Arg Leu Tyr
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 Trp Val Asp Ser Lys Leu His Ser Ile Ser Ser Ile Asp Val Asn Gly
 580 585 590
 Gly Asn Arg Lys Thr Ile Leu Glu Asp Glu Lys Arg Leu Ala His Pro

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Phe Ser Leu Ala Val Phe	Glu Asp Lys Val	Phe Trp Thr Asp Ile Ile
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Asn Glu Ala Ile Phe Ser	Ala Asn Arg Leu Thr	Gly Ser Asp Val Asn
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Leu Leu Ala Glu Asn	Leu Ser Pro	Glu Asp Met Val Leu Phe His
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Asn Leu Thr Gln Pro Arg Gly Val	Asn Trp Cys Glu Arg	Thr Thr Leu
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Ser Asn Gly Gly Cys Gln Tyr	Leu Cys Leu Pro Ala	Pro Gln Ile Asn
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Pro His Ser Pro Lys Phe	Thr Cys Ala Cys Pro	Asp Gly Met Leu Leu
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Ala Arg Asp Met Arg Ser	Cys Leu Thr Glu Ala	Glu Ala Val Ala
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Thr Gln Glu Thr Ser Thr	Val Arg Leu Lys Val	Val Pro Asp Lys Thr
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Val Arg Trp Cys Ala Val Ser	Glu His Ala Thr Lys	Cys Gln Ser
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Phe Arg Asp His Met Lys Ser	Val Ile Pro Ser Asp	Gly Pro Ser Val
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Ala Cys Val Lys Lys Ala Ser	Tyr Leu Asp Cys Ile	Arg Ala Ile Ala
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Ala Tyr Leu Ala Pro Asn Asn	Leu Lys Pro Val Val	Ala Glu Phe Tyr
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Lys Lys Asp Ser Gly Phe Gln	Met Asn Gln Leu Arg	Gly Lys Lys Ser
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Cys His Thr Gly Leu Gly Arg Ser	Ala Gly Trp Asn Ile	Pro Ile Gly
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Val Ala Asn Phe Phe Ser	Gly Ser Cys Ala	Pro Cys Ala Asp Gly Thr
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Asp Phe Pro Gln Leu Cys Gln	Leu Cys Pro	Gly Cys Cys Ser Thr
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